

" Restraining Device"

TECHNICAL FIELD

THIS INVENTION relates to a restraining device adapted to be positioned on an object to provide at least some restraint against movement of the object.

The invention has been devised particularly, although not solely, for positioning on gas cylinders (such as gas cylinders used in oxyacetylene welding operations) to provide some restrain against movement of such cylinders, particularly during transportation and storage.

BACKGROUND ART

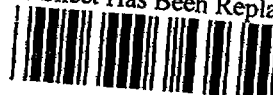
When gas cylinders are transported, they are generally positioned in either an upright position or in a prone position. More particularly, when being transported in a motor vehicle, gas cylinders are generally located in an upright position in a corner of the load carrying area of the motor vehicle and restrained with the aid of chains or ropes. Such an arrangement is not altogether satisfactory as the cylinders may still move and so cause damage to themselves or to the vehicle. Similarly, when transported in a prone position on the load carrying area of the vehicle, the gas cylinders may roll around and cause damage to surrounding parts of the vehicle or themselves.

DISCLOSURE OF INVENTION

The present invention seeks to provide a restraining device adapted to be positioned on an object to provide at least some restraint against movement of the object particularly during transportation and storage.

REPLACED SHEETS	SG
☒ Description : paged1..... to paged12.....	
☒ Claim(s) : paged13..... to paged15.....	
☒ Drawing(s) : paged16..... to paged10/10.....	
☒ Abstract : paged11..... to paged1.....	
DATE OF RECEIPT	

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Preferably, said side portions include a pair of support arms disposed one to each side of said intermediate region of the base portion, each support arm extending from the base portion towards the clamping ring.

Preferably, the outer longitudinal face of said base portion is provided with end sections adapted for engagement with said support surface and an intermediate section disposed between said end sections, said intermediate section being recessed to avoid contact with said support surface upon deformation of said base.

In another form the invention resides in a combination of a restraining device as set forth in any one or more of the preceding paragraphs and a locating means adapted to receive and releasably retain said base of said restraining device, said locating means comprising said support surface.

Preferably, said locating means includes a channel portion for receiving said base portion of said restraining device.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood by reference to the following description of two specific embodiments thereof as shown in the accompanying drawings in which:-

Figure 1 is a perspective view of two restraining devices according to the first embodiment positioned on a gas cylinder for the purpose of restraining the gas cylinder from rolling;

Figure 2 is a perspective view from the upper side of a restraining device according to the first embodiment;

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BEST MODES OF CARRYING OUT INVENTION

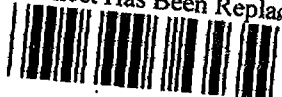
The first embodiment, which is shown in Figures 1 to 7 of the accompanying drawings, is directed to a restraining device adapted to be fitted onto a gas cylinder of the type used in oxyacetylene welding procedures to ensure safe handling of the cylinders particularly during transportation and storage. The restraining device functions to restrain rolling of the cylinder when it is transported in a prone position as illustrated in Figure 1 of the drawings. The restraining device can also be employed to restrain movement of a gas cylinder being transported in an upright position.

In the drawings, the restraining device is indicated generally by reference numeral 11 and the gas cylinder onto which it is fitted is indicated generally by reference numeral 13.

The restraining device 11 comprises a body 15 of polyurethane or other suitable elastomeric material. The body 15 comprises a base 17 for location against a support surface 20 (such as the load carrying tray of a vehicle or a side wall of such a tray). A pair of side portions 19 extend to one side of the base and are formed integrally with the base.

The free ends of the side portions 19 define a gap 21 in the body 15 through which the gas cylinder can pass when the restraining device is being fitted onto, or removed from, the restraining device.

The clamping opening 18 is defined between the base 17 and the side portions 19 of the body 15. More particularly, the base 17 and side portions 19 of the body co-operate to

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The side portions 19 each include a support arm 51 which extends between the respective end of the base portion 41 and the clamping ring portion 23.

The reinforcing webs 49 merge with the support arms 51 to provide a reinforcing structure between the support arms and the base portion. An aperture 53 is provided in each reinforcing web 49 for a purpose which will be explained later.

The outer longitudinal face 45 of the base portion 41 is adapted for location against a support surface which as previously mentioned may be the load carrying tray of motor vehicle or a side wall thereof. The outer longitudinal face 45 is provided with end sections 55 adapted for engagement with the support surface and an intermediate section 57 disposed between the end sections. The outer sections 55 are each inclined inwardly in the direction towards the adjacent end of the base portion. The intermediate section is recessed for the purpose of avoiding contact with the support surface upon deformation of the base in a manner to be described later. The outer sections 55 are provided with a tread structure 59 to facilitate frictional contact between the end sections 59 and the support surface.

Recesses 61 are provided in the longitudinal side faces of the base portion 41 for the purpose of weight reduction and to facilitate deformation of the base portion.

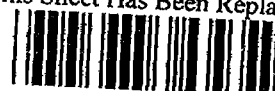
The restraining device according to the embodiment can be employed to restrain a gas cylinder against rolling when it is supported in a prone position on a support surface such as the load carrying tray of a vehicle. In this application of the restraining device, it is preferable that two such restraining devices be employed at spaced apart positions along the gas cylinder, as shown in Figure

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Because of the ability of the body of the restraining device to deform, it is not necessary for the gas cylinder to have an outside diameter which is exactly the same as the inside diameter of the clamping ring portion 23. Indeed, because of the flexibility of the body, the restraining device can accommodate gas cylinders which are somewhat smaller and larger than the inside diameter of the clamping ring portion 23. This feature will now be described with reference to Figures 5, 6 and 7 of the accompanying drawings. In Figure 5, the gas cylinder has an outside diameter which is substantial equal to the inside diameter of the clamping ring portion 23 and in such a case there is no significant deformation of the base 17. When the restraining device is fitted onto the cylinder referring now to Figure 6, there is illustrated an arrangement where the diameter of the cylinder is somewhat smaller than the inside diameter of the clamping ring portion 23 of the restraining device. In this situation, the strap means 27 is employed to pull the side portions 19 towards each other so as to effect a clamping action onto the gas cylinder. This results in deformation of the base 17 and in particular the base portion 41 with the result that contact between the base portion and the support surface is at the inner extremities of the outer sections 55. At this stage, the base is still in stable contact with the support surface; the recessed nature of the intermediate section 57 ensures that the intermediate section does not come in contact with the support surface. If the intermediate section 57 did in fact come in contact with the support surface, it would be likely to cause some instability as it would tend to provide a fulcrum about which the restraining device may rock. Finally referring now to Figure 7, there is illustrated an arrangement where the outside diameter of the gas cylinder is somewhat larger than the inside diameter of the clamping ring 23 with the result that the side portions 23 are deflected

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through sets of aligned holes in the side walls 77 of the channel. The clips are arranged to extend through the apertures 53 in the body 15 of the restraining device at a location disclosed closely adjacent the inner longitudinal face 43 of the base portion 41. In this embodiment, the channel is provided with four sets of locating holes and typically two clips would be employed to locate the restraining device in position, one clip passing through each aperture 53. The sets of holes are arranged so that the clips can be positioned either adjacent a bearing surface 87 at the inner extremity of each aperture 53 (as shown in Figure 9 of the drawings) or adjacent a bearing surface 89 at the outer extremity of each aperture 53 (as shown in Figure 10 of the drawings). The choice as to the particular location of the clips is dependent on the size of the gas cylinder to be restrained. Where, for example, the gas cylinder has an outside diameter which is smaller than the inside diameter of the clamping ring portion 23 of the restraining device, the clips would be located adjacent the inner extremities of the apertures 53 (as shown in Figure 9) to permit the side portions 19 of the body to deflect inwardly into clamping engagement with the gas cylinder. On the other hand, where the gas cylinder has an outside diameter which is larger than the inside diameter of the clamping ring portion 23, the clips would be located adjacent the outer extremities of the apertures (as shown in Figure 10). If the cylinder is of approximately the same size as the clamping ring portion, the choice is not important but more stability can be achieved if the clips are located against the outer extremities.

The bearing surfaces 87, 89 are shaped to accommodate deflections of the base portion 41 towards and away from the base (the channel member. Additionally contact between the clips and the respective bearing surface stops sideways movement of the restraining device along the length of the channel.

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THE CLAIMS defining the invention are as follows:-

1. A restraining device for an object comprising a body having a base for location against a support surface and an opening capable of expansion and contraction for receiving and clampingly retaining said object, said base being adapted for and capable of deformation for maintaining stable contact with said support surface upon expansion and contraction of said opening.
2. A restraining device according to claim 1 wherein said body comprises a pair of side portions extending from said base, said opening being defined between said side portions and said base.
3. A restraining device according to claim 2 wherein said side portions have ends remote from said base which are in spaced apart relationship to define a gap through which said object can be inserted into and removed from said opening, the size of said gap varying with expansion and contraction of said opening.
4. A restraining device according to claim 2 or 3 wherein a securing device is provided for releasably securing the free ends of the side portions together wherein said side portions and said base are formed integrally.
5. A restraining device according to any one of the preceding claims.
6. A restraining device according to any claim 5 wherein said body is formed of resiliently flexibly material.

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13. A combination of a restraining device as set forth in any one of the preceding claims and a locating means adapted to receive and releasably retain said base of said restraining device, said locating means comprising said support surface.

14. A combination according to claim 13 wherein said locating means includes a channel portion for receiving said base portion of said restraining device.

15. A combination according to claim 14 wherein said locating means further includes at least one locking element engagable with said channel for releasably retaining said base portion in the channel.

16. A combination according to claim 15 wherein there are two of said locking elements each adapted to pass through a respective one of said apertures in the body of said restraining device.

17. A restraining device substantially is herein desired with reference to the accompanying drawings.

18. A combination of a restraining device and a locating means substantially as herein described with reference to the accompanying drawings.



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